CLAIMS:

1. A method of feeding a gas phase reactant from a reactant source into a gas phase reaction chamber, wherein

a reactant which is a liquid or solid at ambient temperature is vaporised from the reactant source at a vaporising temperature;

the vaporised reactant is fed into the reaction chamber; and

the reactant source and the reaction chamber are located in separate vessels which can be individually evacuated,

characterized in that

vaporising the reactant from liquid or solid reactant matter maintained in a reactant source comprising a first container having an opening, said first container being placed within a pressure shell and being heated to the vaporising temperature by using heating means fitted within the pressure shell;

conducting the vaporised reactant from the container through a first purifier to remove impurities contained in the vaporised reactant;

collecting the vaporised reactant in a gas space; and

feeding gas phase reactant from the gas space into the gas phase reaction chamber via the first conduit.

2. The method according to Claim 1, wherein the reactant source and the reaction chamber are thermally isolated from each other.

3. The method according to Claim 1, wherein the reactant source and the reaction chamber are interconnected with a first conduit comprising at least one valve.

4. The method according to Claim 3, wherein the valve is used for separating the gas spaces of the reactant source and the reaction chamber during evacuation of either or both of the vessels.

5. The method according to any of Claims 1, wherein the reactant source and the reaction chamber are interconnected with a first conduit in which the flow of reactant from the reactant source to the reaction chamber is prevented by forming a gas phase barrier of a gas flowing in the opposite direction to the reactant flow in the conduit.

6. The method according to any of Claim 1, wherein the reactant source is operated at a pressure in excess of the pressure of the reaction chamber.

7. The method according to any of Claim 1, wherein the reactant source comprises at least one inlet for feeding gas into the reactant source and at least one outlet for withdrawing gas from the reactant source.

8. The method according to Claim 7, wherein the outlet of the reactant source communicates with the reaction chamber.

9. The method according to Claim 1, wherein the vaporised reactant is conducted to a purifier for removing any dispersed liquid droplets or solid particles contained therein.

10. The method according to Claim 9, wherein the purifier comprises a semipermeable membrane or similar filter capable of essentially completely removing fines having a size of less than 0.01 μm, preferably less than 0.005 μm.

11. The method according to Claim 1, wherein the reactant is fed into the reaction chamber in the form of gas phases pulses, comprising collecting the vaporised reactant in a gas space having a gas volume significantly greater than the volume of the gas phase pulse; and feeding one gas phase pulse at a time from the gas space into the gas phase reaction chamber via a first conduit.

12. The method according to Claim 1, wherein the container is provided with active thermal insulation.

13. The method according to Claim 1, wherein the vaporised reactant is purified in the first purifier and then collected in the gas space.

14. The method according to Claim 1, wherein the first purifier comprises a mechanical filter covering the opening of the container.

15. The method according to Claim 1, wherein the container has a central axis and an annular cross-section perpendicular to the central axis, the opening being formed at least on the inner surface of the container.

16. The method according to Claim 1, wherein the container has a central axis and a circular cross-section perpendicular to the central axis, the opening being formed on the top surface of the container.

17. The method according to Claim 1, wherein the container has a central axis and a circular cross-section perpendicular to the central axis, the opening being formed on the side walls of the container.

18. The method according to Claim 1, wherein the vaporised reactant is collected in a gas space surrounding the container.

19. The method according to Claim 18, wherein the gas space is formed in the interspace between the first container and a second container surrounding the first container.

20. The method according to Claim 1, wherein the gas space is maintained at a temperature equal to or higher than the vaporising temperature.

21. The method according to Claim 1, wherein the gas volume of the gas space is at least 5 times greater than the gas volume of one gas phase pulse.

22. The method according to Claim 1, wherein a substantial length of the first conduit is contained within the pressure shell.

23. The method according to Claim 1, wherein a second purifier is placed in the first conduit.

24. The method according to Claim 23, wherein the second purifier comprises a purifying means selected from the group of mechanical filters, ceramic molecular sieves and electrostatic filters capable of separating dispersed liquid or solid droplets or particles or molecules of a minimum molecular size from the reactant gas flow.

25. The method according to any of Claims 1, wherein

inactive gas is fed into said first conduit via a second conduit, connected to the first conduit at a connection point, during the time interval between the feed of vapour-phase pulses from the gas space so as to form a gas phase barrier against the flow of vaporised reactants from the reactant source via the first conduit into the reaction chamber; and

the inactive gas is withdrawn from said first conduit via a third conduit connected to the first conduit, said third conduit being maintained at a temperature equal to or higher than the condensation of the vapour-phase

reactant and being connected to the first conduit at a point upstream of the second conduit.

26. The method according to Claim 25, wherein a substantial length of the second conduit is placed within the pressure shell.

27. The method according to Claim 25, wherein, at least for some length of the first conduit the inactive gas fed via the second conduit is conducted in opposite direction to the reactant flow.

28. The method according to Claim 25, wherein the third conduit is maintained at a temperature equal to or lower than the reaction temperature.

29. The method according to Claim 25, wherein the third conduit comprises an open gas flow channel placed within the pressure shell.

30. The method according to Claim 25, wherein the inactive gas is fed into the first conduit at a point downstream of the point at which the second conduit is connected to the first conduit to provide a flow of inactive gas which is directed in the opposite direction to the reactant flow in the first conduit.

31. The method according to any of Claims 1, wherein inactive gas is used as a carrier gas for the vaporised solid or liquid reactant.

32. The method according to Claim 31, wherein the inactive gas is fed into the gas space via a fourth conduit.

33. The method according to any of Claims 1, wherein the flow of vaporised reagent and optionally inactive gas through the first conduit is controlled by valves whose regulating means are placed on the outside of the pressure shell.

34. The method according to Claim 19, wherein the second container is detachably connected to the first and the fourth conduits.

35. The method according to Claim 1, wherein the heating means comprise tubular resistive heater elements.

36. The method according to any of Claims 1, wherein the heating means are fitted close to the pressure shell.

37. Reactant source assembly for generating a gas phase reactant flow, comprising:

a first container having an opening and containing liquid or solid reactant matter;

a second container having a gas tight container wall enclosing the first container and defining a gas space around the first container;

at least one first gas nozzle fitted in the container wall of the second container for feeding gas into the gas space; and

at least one second gas nozzle fitted in the container wall of the second container for withdrawing reactant vaporized from first container and collected in the gas space.

38. The reactant source assembly according to Claim 37, comprising further at least one valve for controlling gas flow through the first gas nozzle into the gas space and at least one valve for controlling gas flow through the second gas nozzle from the gas space.

39. The assembly according to Claim 37, wherein the container wall of the second container is made of a metal selected from the group of stainless steel, titanium and aluminum.

40. The assembly according to Claims 37, wherein the first container is made from glass.

41. The assembly according to Claim 37, wherein the first container is made from metal, graphite or ceramic materials, said container having a non-reactive surface layer.

42. The assembly according to Claim 37, wherein the opening of the first container is covered with a mechanical filter to remove impurities from gas vaporised from the liquid or solid matter contained therein.